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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte THOMAS BENGTSSON and MAUDE WIKSTRÖM[1]

Appeal 2016-003356
Application 10/585,867
Technology Center 1600

Before ERIC B. GRIMES, TAWEN CHANG, and
JOHN E. SCHNEIDER, *Administrative Patent Judges*.

SCHNEIDER, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) involving claims to a kit for detecting periodontal disease which have been rejected as obvious. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

STATEMENT OF THE CASE

The present invention is directed to kits for detecting periodontal disease. Spec. 1. The kit comprises a pair of assays. Spec. 6. The first assay detects a substance originating from a bacterium and the second assay

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[1] Appellants identify the Real Party in Interest as Tendera AB. Appeal Br. 3.

detects a substance originating from the immune or inflammatory system of the patient. *Id.*

Claims 1, 2, 11, 17, 18, 42, and 43 are on appeal. Claim 1 is illustrative and reads as follows:

> 1. A test kit comprising:
> a first detection assay for detecting a first substance originating from bacteria, wherein the first substance is arg-gingipain from *Porphyromonas gingivalis;* and
> a second detection assay for detecting a second substance originating from at least one of an immune and an inflammatory system of a patient, wherein the second substance is a natural serine protease.

The claims stand rejected as follows:

Claims 1, 2, 11, 17, 18, 42, and 43 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Wagner[2] in view of Armitage.[3]

Claims 1, 2, 11, 17, 18, 42, and 43 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Reynolds[4] in view of Singer[5] and Chapple.[6]

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[2] Wagner et al., WO 02/06820 A3, published Jan. 24, 2002 ("Wagner").
[3] Armitage et al., *Longitudinal Evaluation of Elastase as a Marker for the Progression of Periodontitis*, 65 J. Periodontol. 120 (1994) ("Armitage").
[4] Reynolds et al., US 6,511,666 B1, issued Jan. 28, 2003 ("Reynolds").
[5] Singer, Jr., US 5,376,532, issued Dec. 27, 1994 ("Singer").
[6] Chapple, *Periodontal disease diagnosis: current status and future developments*, 25 J. Dentistry 3 (1997) ("Chapple").

THE FIRST REJECTION UNDER 35 U.S.C. § 103(a)

Issue

The issue with respect to this rejection is whether the Examiner has established by a preponderance of the evidence that the pending claims would have been obvious over Wagner combined with Armitage under 35 U.S.C. § 103(a).

The Examiner finds that Wagner teaches diagnostic test kits for detecting periodontitis comprising multiple diagnostic assays for both arg-gingipain and elastase and further teaches that detecting arg-gingipain is a particularly preferred embodiment. Final Act. 7. The Examiner finds that Armitage teaches the advantages of using elastase as a marker for the detection of periodontal disease. *Id.* The Examiner concludes that

> it would have been *prima facie* obvious to a person of ordinary skill in the art, at the time the invention was made, to modify a test kit comprising multiple detection assays for detecting a first substance originating from bacteria, wherein the first substance is arg-gingipain from *Porphyromonas gingivalis* as taught by [Wagner], by using a second detection assay for detecting a second substance originating from at least one of an immune and an inflammatory system of a patient, wherein the second substance is the natural serine protease, elastase, as taught by both [Wagner] and Armitage et al., thereby arriving at the claimed invention, because testing for the arg-gingipain marker was art-recognized as particularly preferred as taught by [Wagner] and testing the elastase marker was known to be advantageous because it was both (1) recognized as producing fewer false positive results and (2) recognized as best used in conjunction with other assessments of periodontal disease, as taught by Armitage et al.

Final Act. 8.

Appellants contend that Wagner discloses thousands of possible combinations and that there is no guidance in the references to make the combination suggested by the Examiner. Appeal Br. 8–9. Appellants argue that the references teach away from the claimed combination. Appeal Br. 10–11. Appellants also argue that there is evidence of unexpected results which rebuts the Examiner's case of obviousness. Appeal Br. 11–12. With respect to claim 43, Appellants argue that the art does not suggest a "test kit that consists essentially of tests for the two named proteases," as claimed. Appeal Br. 13.

Findings of Fact

We adopt as our own the Examiner's findings and analysis. The following findings are included for emphasis and reference convenience.

FF1. Wagner discloses a kit for detecting bacteria which cause periodontitis. Wagner 1.

FF2. The kit of Wagner can detect enzyme activities which indicate the presence of periodontitis-producing bacteria. Wagner 8

FF3. Wagner teaches that one of the preferred enzymes which indicates the presence of bacteria is arg-gingipain. Wagner 8.

FF4. Wagner also teaches that destruction of periodontal tissue can be detected by looking for the presence of certain enzymes such as elastase. Wagner 9.

FF5. Wagner teaches looking for one or more markers for periodontal disease. Wagner 6 ("marker compound" includes substances indicating mouth disorders), 16 ("one or more enzymes serve as a marker substance").

FF6. Armitage discloses the use of elastase as a marker for periodontitis. Armitage 120.

FF7. Armitage teaches that "[o]ne of the main strengths of the VES [visual elastase scores] system, when used to predict the progression of periodontitis, is the relatively low number of false negatives." Armitage 125.

FF8. Armitage teaches that

> [t]he ability of a positive VES test to identify sites that are at an increased risk of developing bone loss indicates that is [sic] may have several useful clinical applications. Such a test might be helpful in identifying sites that require additional treatment prior to the maintenance phase of therapy. It may also be helpful in determining a recall/maintenance interval for treated patients; for example, those with positive elastase tests may need more frequent recall visits. As risk assessment tests for periodontal disease are refined and developed, it is probable that they will not be used alone, but rather in conjunction with traditional clinical assessments of periodontal disease.

Armitage 127.

Principles of Law

A proper § 103 analysis requires "a searching comparison of the claimed invention—including all its limitations—with the teaching of the prior art." *In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995).

> Although a reference that teaches away is a significant factor to be considered in determining unobviousness, the nature of the teaching is highly relevant, and must be weighed in substance. A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use.

In re Gurley, 27 F.3d 551, 553 (Fed. Cir. 1994).

> [B]y definition, any superior property must be *unexpected* to be considered as evidence of non-obviousness. Thus, in order to properly evaluate whether a superior property was unexpected, the [fact-finder] should have considered what properties were expected. Here, Pfizer's evidence must fail because the record is devoid of *any* evidence of what the skilled artisan would have expected.

Pfizer, Inc. v. Apotex, Inc., 480 F.3d 1348, 1371 (Fed. Cir. 2007).

"[I]t is well settled that unexpected results must be established by factual evidence. 'Mere argument or conclusory statements in the specification does not suffice.'" *In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997) (quoting *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1994)).

Analysis

Claim 1 is representative of the rejected claims and is directed to a kit having a first assay which detects arg-gingipain and a second assay which detects elastase.

We agree with the Examiner that the subject matter of claim 1 would have been obvious to one skilled in the art at the time the invention was made. Wagner teaches a kit containing one or more assays for detecting periodontitis. FF5. Wagner teaches that arg-gingipain is one of the preferred markers to be detected by the kit. FF3. Wagner also teaches that the kit can be used to detect other markers such as elastase. FF4 and 5. Armitage teaches that use of elastase as a marker for periodontitis produces fewer false negatives than other assays. FF7. We agree with the Examiner

that a test kit consisting of the two claimed assays would logically flow from the teachings of the prior art. Ans. 7.

Appellants argue that Wagner discloses thousands of possible combinations and there is nothing in the references that would lead one skilled in the art to use two enzymes as markers for periodontitis. Appeal Br. 7–9; Reply Br. 2–4. We are unpersuaded. Wagner expressly teaches that arg-gingipain is one of two markers which are derived from a periodontitis-causing bacterium. FF3. Armitage teaches that elastase produces fewer false negatives than other markers and that elastase-based tests "may have several useful clinical applications" including detection of periodontitis. FF7 and 8. The claimed combination of assays therefore would have been obvious based on the cited references.

Appellants argue that Armitage teaches away in that Armitage teaches that a weakness of the VES test is the high incidence of false positives and also discusses other methods for assessing periodontitis. Appeal Br. 10–11. We are unpersuaded. As noted above, Armitage specifically states that a test based on elastase may have useful clinical applications. This would appear to be opposite of a teaching away. Moreover, that Armitage teaches that other methods may be used does not constitute a teaching away. *In re Gurley*, 27 F.3d at 553.

Although Armitage teaches that "a weakness of the VES test is the high number of false positives it did record," it also teaches that other tests were "unacceptable" because of their high percentages of false negatives. Armitage 126, left col. Armitage concludes that "the VES test system is a better method of identifying sites that are at an increased risk of progressing

than are the GI, PI, probing depth, or bleeding on probing taken singly or in combination." *Id.* at 126, right col. Thus, it does not teach away.

Appellants argue that the claimed method provides unexpected results, because "all of Armitage's elastase tests with a sensitivity above 80% have a specificity below 50%, and the elastase tests with a specificity above 80% all have a sensitivity less than 55%," while "the combination of arg-gingipain and elastase as diagnostic markers results in a test with both a sensitivity (83%) and a specificity (90%) in excess of 80%." Appeal Br. 12.

However, the Specification merely characterizes its results as showing that "the combination of elastase and arg-gingipain as a marker for periodontal disease yields a statistically more significant test than either of the enzymes alone." Spec. 21:9–12. Appellants have produced no evidence to support their position that the results are *unexpectedly* superior. Arguments and unsupported statements of unexpected results will not rebut a prima facie case of obviousness. *In re Geisler*, 116 F.3d at 1470.

Turning to claim 43, the use of the term "consisting essentially of" does not render the claimed invention patentable over the prior art. As discussed above Wagner teaches a kit which may comprise assays for one or more markers, clearly suggesting a kit containing only two assays. In addition, Appellants have not shown that the degree of both sensitivity and specificity achieved by the kit of the invention is unexpected.

Conclusion of Law

We conclude that the Examiner has established by a preponderance of the evidence that claims 1 and 43 would have been obvious over Wagner combined with Armitage under 35 U.S.C. § 103(a).

Claims 2, 11, 17, 18, and 42 have not been argued separately and therefore fall with claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

THE SECOND REJECTION UNDER 35 U.S.C. § 103(a)

Issue

The issue with respect to this rejection is whether the Examiner has established by a preponderance of the evidence that the rejected claims would have been obvious over Reynolds combined with Singer and Chapple.

The Examiner finds that Reynolds teaches kits for detecting periodontitis including using arg-gingipain as a marker for a bacterium associated with periodontitis. Final Act. 18. The Examiner finds that Reynolds teaches that a second marker for periodontitis may be combined with the arg-gingipain assay. *Id.* at 19. The Examiner finds that Singer teaches that detection of just a pathogen associated with periodontitis is insufficient and that a second biomarker should be used. *Id.* at 19–20. The Examiner finds that Singer teaches that elastase is the preferred biomarker. *Id.* at 20. The Examiner finds that Chapple teaches methods for detecting periodontal diseases through the use of two or more assays where one assay detects a marker indicating the presence of a pathogen and the other detects a biomarker associated with tissue destruction. *Id.* The Examiner finds that among the assays described in Chapple are assays which detect trypsin-like enzymes from the pathogen and assays which detect elastase. *Id.* at 21. The Examiner concludes that

> it would have been *prima facie* obvious to a person of ordinary skill in the art, at the time the invention was made, to modify a diagnostic test kit comprising multiple detection assays wherein a first detection assay comprises arg-gingipain from

> *Porphyromonas gingivalis* (i.e. a first substance originating from bacteria) as taught by Reynolds et al., by adding a second detection assay for detecting a second substance originating from the immune or inflammatory system of a patient (i.e. a second substance from a patient) wherein that second marker is elastase, as taught by both Singer et al. and Chapple, to arrive at the claimed invention, because it was insufficient and ineffective to measure biomarkers from only the bacterial pathogens and elastase was a preferred biomarker derived from a patient[] at risk of periodontal disease as taught by Singer et al.

Id. at 21–22.

Appellants contend that there is no reason to combine the references or to even select the specific references cited by the Examiner. Appeal Br. 13–14. Appellants argue that the references teach away from the claimed combination and that there is evidence of unexpected results which overcomes the Examiner's prima facie case of obviousness. Appeal Br. 14–15.

Findings of Fact

We adopt as our own the Examiner's findings and analysis. The following findings are included for emphasis and reference convenience.

FF9. Reynolds teaches kits for detection of periodontal disease. Reynolds col. 4, ll. 55–63.

FF10. Reynolds teaches using Arg-specific endopeptidases as a biomarker for periodontal disease. Reynolds col. 6, ll. 39–49. *See also id.* at col. 21, ll. 36–41 (The "Arg-specific endopeptidase component of the PrtR complex has the same characteristics and N-terminal sequence as the 50 kDa Arg-specific proteinase . . . designated Arg-gingipain.").

FF11. Singer teaches that "[w]hile bacterial pathogens are necessary for the development of gingivitis and periodontitis, measuring the presence or absence of specific bacterial pathogens themselves is not a sufficient or effective means of predicting the likelihood of experiencing active disease." Singer col. 2, ll. 39–43.

FF12. Singer teaches the use of an assay for periodontal disease which uses enzymes produced by the patient as biomarkers. Singer col. 8, ll. 34–40.

FF13. Elastase is one of two preferred markers used by Singer. *Id.*

FF14. Chapple teaches detection of periodontal disease using enzymes produced by periodontal pathogens and enzymes produced by the host such as elastase. Chapple 8 and Tables 1 and 2.

FF15. Chapple teaches that "[w]hilst all of the markers discussed offer greater diagnostic sensitivity and specificity than clinical assessments currently available, it is likely that combining two or three such markers in a single chair-side test will provide the most accurate means of diagnosing ongoing or future disease activity." Chapple 8.

FF16. Chapple teaches that trypsin-like enzymes and elastase are two of the enzymes tested used to detect periodontal disease. Chapple 10, Table 2.

Analysis

Claim 1 is representative of the rejected claims and is directed to a kit having a first assay which detects arg-gingipain and a second assay which detects elastase.

We agree with the Examiner that the subject matter of claim 1 would have been obvious to one skilled in the art at the time the invention was made. Reynolds teaches the use of an assay for arg-gingipain to detect periodontal disease. FF9 and 10. Singer teaches that detection of the presence of a periodontal pathogen alone is insufficient to properly diagnose periodontal disease. FF11. Singer teaches testing for host derived enzymes such as elastase to detect periodontal disease. FF12 and 13. Chapple teaches that using two or three biomarkers will provide the most accurate means of diagnosing periodontal disease. FF15. We agree with the Examiner that one skilled in the art would find it obvious to combine the assay of Reynolds with the assay of Singer to produce a test kit with improved accuracy. Final Act. 21–22.

Appellants contend that the Examiner has offered no reasons why one skilled in the art would select the claimed combination over the thousands of possible combinations in the art. Appeal Br. 13–14. We are unpersuaded. As the Examiner points out, Chapple teaches that as few as two biomarkers are needed to improve accuracy and, combined with the teachings of Reynolds and Singer, provides sufficient guidance to combine the references. Ans. 25.

Appellants also argue that Chapple teaches away from the claimed combination. Appeal Br. 14. We are unpersuaded. While Chapple discusses different diagnostic procedures which can be used to detect periodontal disease, Chapple states that "[t]he most promising medium for the collection of valuable diagnostic information is gingival crevicular fluid (GCF)." Chapple 8. Chapple teaches that assays that test for such enzymes

as elastase and bacterial trypsin-like enzymes are used to test GCF to detect periodontal disease. Chapple 8–9, Table 1. Appellants have pointed to nothing in Chapple which teaches away from using the claimed markers.

Appellants' arguments with respect to unexpected results and claim 43 are essentially the same as the arguments made with respect to the rejection based on Wagner and Armitage and have been addressed above.

Conclusion of Law

We conclude that the Examiner has established by a preponderance of the evidence that claims 1 and 43 would have been obvious over Reynolds combined with Singer and Chapple under 35 U.S.C. § 103(a).

Claims 2, 11, 17, 18, and 42 have not been argued separately and therefore fall with claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

SUMMARY

We affirm the rejections under 35 U.S.C. § 103(a).

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED